

E72-10100  
CR-128149

Type I Progress Report  
ERTS I

a. Title: Cartographic Evaluation of ERTS Orbit and Attitude Data

ERTS-A Proposal No.: SR 150

b. GSFC ID No. of P.I.: IN 043

c. Problems:

1. The investigation is based on RBV images; with the RBV system turned off, there are only a limited number of images for analysis.
2. The procedure for acquiring positions and attitude data has not been established.

d. Accomplishments:

1. One RBV frame (1003 1875 Band 3) of 70 mm bulk imagery has been evaluated for geometric distortion by comparing the measured coordinates of the 81 reseau points with the calibrated values. The rms distortion is  $9\ \mu\text{m}$  at the 1:7,300,000 scale of the faceplate or about 66 m on the ground. The worst distortion is 160 m and 90% of the distortion is less than 110 m.

Preliminary evaluation indicates that this distortion is less than expected and considerably less than preflight laboratory tests.

If these low distortions can be consistently obtained during bulk processing on the EBR, the bulk RBV images can be considered a frame-format geometric projection. Properly scaled and rectified to control, they could be suitable for map scales as large as 1:250,000.

The  $9\ \mu\text{m}$  distortion is also less than the  $10\ \mu\text{m}$  which was predicted to be of visual significance for three-camera register of a color-composite image at 1:1,000,000 scale. If greater color misregistration than  $10\ \mu\text{m}$  can be accepted, then larger scale color composites can be prepared directly from the bulk images.

(E72-10100) CARTOGRAPHIC EVALUATION OF  
ERTS ORBIT AND ATTITUDE DATA Progress  
Report, 1 Jul. - 31 Aug. 1972 R.B. McEwen  
(Geological Survey, McLean, Va.) 1 Sep.  
1972 3 p

N72-32353

Unclas

CSCL 08B G3/13 00100

2. Ground control points have been measured on one RBV frame in the San Francisco Bay area. The image coordinates will be refined for residual distortions and transformed to ground coordinate values.
- e. Significant scientific results:
1. The low geometric distortion of the RBV bulk images will greatly simplify the register of multispectral images and the reference of the scene to published maps. Preparation of photomaps at scales larger than 1:1,000,000 also appears possible. (Category 9A)
- f. Published articles: None
- g. Recommended changes in operations:
1. It appears practical to reduce the number of reseau crosses and their size on future RBV systems. If possible, ERTS-B could incorporate the change.
  2. Goddard Space Flight Center must establish some procedure for providing the principal investigator with the satellite position and attitude data for specified exposure times.
- h. Changes in Standing Order Forms: None
- i. ERTS Image Descriptor forms: None
- j. Changes in Data Request forms: None
- k. DCP Status: Not Applicable (N/A)



**"Made available under NASA sponsorship  
in the interest of early and wide dis-  
semination of Earth Resources Survey  
Program information and without liability  
for any use made thereof."**

CARTOGRAPHIC EVALUATION OF ERTS ORBIT AND ATTITUDE DATA

Robert B. McEwen  
U.S. Geological Survey  
1340 Old Chain Bridge Road  
McLean, Virginia 22101

1 September 1972

Type I Progress Report for Period 1 July 1972 - 31 August 1972

Prepared for:

Goddard Space Flight Center  
Greenbelt, Maryland 20771

Publication authorized by the Director, U.S. Geological Survey